Please add claims 9-25, as follows.

9. A method for removal of contaminants in a soil formation comprises:

supplying ambient air and ozone at concentrations to effect removal of the contaminants;

producing microbubbles containing the ambient air and ozone at concentrations to effect removal of contaminants; and

introducing the microbubbles containing the ambient air and ozone at concentrations to effect removal of contaminants into the soil formation under conditions that contaminants in a dissolved state in the soil formation are pulled out of the soil formation through the microbubbles and are provided in a vapor state within the microbubbles to react with the ozone contained in the microbubbles in accordance with Henry's law.

10. The method of claim 9 wherein the microbubbles are sized in accordance with a porosity characteristic of the soil formation.

11. The method of claim 9 wherein introducing further comprises:

providing a plurality of injection wells to introduce the microbubbles containing the ambient air and ozone.

12. The method of claim 11 wherein introducing further comprises:

using a plurality of microporous diffusers in the plurality of injection wells to introduce the microbubbles containing the ambient air and ozone.

13. The method of claim 9 wherein the soil formation contaminants with a Henry's constant in the order of about 2.59×10^{-2} to 4.48×10^{-5}.

14. The method of claim 9 wherein contaminants in the soil formation are decomposed by ozone interaction in the bubbles with the contaminants.

15. The method of claim 9 wherein the fine bubbles have an initial bubble size at least between about 5 to 200 microns.

16. A method for removal of contaminants in a soil formation comprises:

providing a plurality of injection wells and introducing ambient air and ozone as microbubbles through the injection wells by using a corresponding micro-porous diffuser for each one of the plurality of injection wells;

surrounding the micro-porous diffusers with a sand pack disposed between the micro-porous diffusers and the surrounding soil formation; and

introducing ambient air and ozone as microbubbles by using micro-porous diffusers in the injection wells under conditions that moist soils promote contaminants that exist in a dissolved state in the soil formation to be pulled out of the soil formation through membranes of the microbubbles and react in a vapor state within the microbubbles with the ozone contained in the microbubbles.

17. The method of claim 16 wherein the microbubbles increase the lifetime of ozone in the soil formation.

18. The method of claim 16 wherein removal of contaminants can occur without a vapor extraction.

19. The method of claim 16 further comprising pulsing a water phase to provide steady upward migration of the micro-fine bubbles through the soil formation.

20. The method of claim 16 wherein the soil formation contains chlorinated hydrocarbons.

A2

21. The method of claim 16 wherein the soil formation contains chlorinated ethenes.

Sub B1

22. The method of claim 16 wherein the contaminants include chlorinated ethenes including dichloroethene, trichloroethene, and/or tetrachloroethene.

23. The method of claim 16 wherein the micro-porous diffusers have a pore size

between about 5 to 200 microns to provide the fine bubbles.

24. The method of claim 16 wherein the micro-porous diffusers have a pore size selected to match a porosity characteristic of the surrounding soil formation.

25. The method of claim 16 wherein the micro-porous diffusers have a pore size selected to match a porosity characteristic and a permeability characteristic of the surrounding soil formation.